The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

BOUVERIE HOUSE, 154, FLEET STREET, LONDON, E.C.4

Telegrams: ALLANGAS FLEET LONDON
Telephone: CENTRAL 3212 (10 lines)
GLASGOW: 116, Hope Street (Central 3970)
BIRMINGHAM: Daimler House, Paradise Street (Midland 0784-5)
THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited

VOL. XLIV. No. 1128 February 8, 1941 Annual Subscription, 21s. Overseas, 26s.

Women in the Chemical Industry

THE paper which Miss Haslett read to the Royal Society of Arts recently on the subject of Women in Industry raises problems that are very much to the fore just now. Whatever may have been the position of the country's labour force in 1914-18, difficulties are likely to be accentuated during this war because of the enormously increased mechanisation of the fighting forces which has resulted in many more men being required for the production of munitions per fighting man than in the first world war. It has been pointed out recently that for every man sent into the air an air force requires between 30 and 40 men on the ground, engaged for the most part in technical work of a skilled nature. This means the withdrawal of intelligent men from industry and leaves behind the need for a labour force in the munition and similar works that is again a high multiple (probably at least eight) of the numbers enrolled in the fighting forces. The problem of obtaining the necessary labour and of maintaining our army with its equipment can only be solved by the employment of a vast number of women in many forms of employment heretofore considered as suitable only for men. This was, of course, done in 1914-18, but the labour requirements of this war probably make it necessary to employ women on an even greater scale to-day. The position of the chemical industry in this dilution requires considerable thought and the facts suggest that it will require better organisation than upon the previous occasion.

During the previous war, the proportion of women in the chemical trades rose from 20 per cent. to 39 per cent. and the number increased by 64,000, of whom 35,000 directly replaced men. For the most part these women worked in explosives, in soap and candles, in drugs and fine chemicals (in which many were engaged before the war), and in heavy chemicals, in which there were but few before the war. The experience of the chemical trades upon that occasion was not particularly good. In heavy chemicals, for example, the women were employed as labourers, and in packing, loading, and so forth; it was not considered desirable to employ them to any extent in process work nor in firing salt pans or handling wet salt in the salt trade. The need to put women on to the lighter work and men on to the heavier work was accepted cheerfully by the men, but reduced their own output. At first anything up to five women were required to replace one man, but figures given after the war by the Chemical Employers' Federation showed that according to the nature of the work 1.6 to 2.8 women were required to replace a man, whilst the cost was still further increased by the extra supervision, and the special staff required for dealing with a large influx of women workers; manufacturing costs were estimated to have been increased and the conclusion was reached that heavy chemicals was not a trade suitable for women.

In drugs and fine chemicals there was some substitution of women for men in process work and they also assisted in packing and light porterage work. Their output was less than that of the men and their cost was consequently greater. A fundamental difficulty both in the works and in laboratories was that they were not found to be particularly ambitious and left on account of marriage before the firms could reap the advantage gained by training them. In explosives women's work was largely confined to processes not generally considered by employers as men's work, the comparison being between high-grade female labour and low-grade male labour. In these circumstances women's labour was said to be good, though it is also recorded that they "showed no initiative in emergency and required a longer period to learn the work." In the national factory at Gretna, women were found to require more supervision than men.

It must be confessed that the records of the last war of women in the chemical industry were disappointing, but the necessity for employing women in industry wherever it is possible will almost inevitably lead to further employment of women in chemical industries in the present war. It must be remembered that the mental quality of the women to-day is probably higher than it was 25 or 30 years ago in consequence of the social changes brought about by the last war. Experience is showing that for engineering and in many other directions women can be used equally with men, and Mr. Watson Smythe, who, we believe, is directing this work for the Government, claimed during the discussion on Miss Haslett's paper, that there is no job that men cannot do that a woman cannot undertake, provided *that she is selected for the purpose*. Miss Haslett stated that women in many engineering works are earning 75 per cent. bonus, whereas men are earning only 50 per cent. bonus. It appears that selection and careful training of the women for their work is necessary, together with adequate welfare work. On the Continent a large number of women are taking up chemical engineering as a profession. The moral of all this appears to be that the chemical trades should begin to select and train women in the works at once in order that they may be ready to take the place of men when more labour is required, and that modern psychological methods of selection should be utilised.

CONTENTS

Women in the Chemical Industry	81
Notes and Comments	82
The Manufacture of Humus	83
Synthetic Rubber in the Chemical Industries	85
A Chemist's Bookshelf	86
Importation of Starch Products	87
The China Clay Situation	87
Propiolic Acid	87
New Control Order	87
Letter to the Editor	87
Personal Notes	88
Silver Ores, Concentrated and Residues	88
Chemical Matters in Parliament	88
Chemicals Liable to K.I.D.	88
General News from Week to Week	89
Weekly Prices of British Chemicals	90
Commercial Intelligence—Stocks and Shares	92

NOTES AND COMMENTS

New Uses for Coal in Agriculture

THE utilisation of coal wastes is a subject of considerable interest, not only in the coal industry, but in those industries that might find some use for the material. In view of the article in this issue on the manufacture from habitation waste products of humus required to rehabilitate " spent " soils, it is of interest to note that the U.S. Bureau of Mines is working upon a process for the recovery of humic acid from coal wastes by electrodialysis. No details of the process have been given so far as is known, but it would seem an encouraging outlet. Humus, the product of the partial decay of animal and vegetable matter, is the major constituent of peat, and by further metamorphosis this becomes coal. Coal humus, however, is very different from peat humus, and this again is different from soil humus; whether it will be possible to recover from coal " humus " that will be of value in agriculture and horticulture is not known. All depends upon whether it can be completely decomposed after extraction by bacteria. The nitrogen content of coal is sufficiently high for the process to be encouraging, provided that the nitrogen is concentrated in the humus and not in the rejects. Other elements possibly required by plants, especially phosphorus, are present in most coals only to a very small extent, although Indian coals are frequently high in phosphorus, sometimes containing as much as 0.5 per cent.

Darkening Light Soils

ANOTHER interesting American suggestion is the use of coal dust as a soil conditioner for darkening light soils. The physics underlying this suggestion is that by darkening the colour of the soil, its absorptive capacity for the sun's rays is increased, thus increasing the temperature and accelerating the rate of plant growth. It is another facet of the modern development of soil warming, using however, the heat of the sun instead of the heat of combustion. Successful application of dust coal for this purpose has been reported from several countries. In an American experiment a week of sunny weather ensued with maximum temperatures between 90° and 100° F., which were high enough normally to cause serious damage to gladioli plants by excessive tip burning. The darkened soil, however, protected the gladioli from the reflected rays to such an extent that little tip burning took place, thus showing yet another aspect of the proposition. It is also found that between 50 and 100 tons of coal are necessary to darken one acre of soil to a depth of two inches, but since growth is hastened by a week or more, the return from an earlier crop would be sufficiently high in price to make the proposition pay. If the coal dust used is really a waste product, there is no more to be said, but if not we may well reflect that the world would be paying too high a price to squander its coal reserves in this way so that epicures could taste their favourite victuals a week or so earlier than usual.

Nutrient Bread

IT is not only in Great Britain that attention is being paid to the nutrious properties of food. In a recent American article we read that the supermilling of flour to produce white bread " scalped the life from the wheat grain. . . . To-day our pure white flour has lost all but a fraction of the thiamin, the riboflavin, the nicotinic acid that were the secret of the bread's strength. In vitamins, one slice of the whole-wheat bread of our forefathers was worth five slices of the bread most of us eat to-day." There is even a suggestion by some workers that laziness, dullness of intellect, and so forth are due to absence of certain essential chemical constituents now lacking in modern foods. Thus men may starve in the midst of plenty and with a luxurious diet. The answer to this problem in America is judged to lie in the discovery by R. R. Williams, of the Bell Telephone Laboratories, of the synthetic production of thiamin from coal tar. Since then nicotinic acid and riboflavin have also been synthesised by the chemical industry and are available in quantity to add to foodstuffs. Only four years ago the first gram of thiamin was produced and was first quoted commercially at nearly £200 a gram. To-day a gram costs 98 cents in U.S.A., say 5s. It is believed that soon the price will drop to 12 cents. One gram of thiamin is sufficient for one person for a year. It is thus planned in America by the Millers' National Federation to vitaminise flour by the addition of these three chemicals, all of which can now be produced in quantity and cheaply, without extra cost to the consumer. The comment is inevitable: What are we doing about it in this country?

Leverhulme Research Fellowship, 1941

APPLICATION is invited for (i) Fellowship or (ii) Grants in aid of research. The fellowships and grants are intended for senior workers who are prevented from carrying out research work by routine duties or pressure of other work. They are limited to British-born subjects normally resident in Great Britain. In exceptional circumstances the trustees may waive the condition as to residence. The trustees are also prepared to consider applications from groups of workers engaged upon co-operative programmes of research—particularly from those engaged upon long-distance programmes or in institutions in which the normal facilities for research have been curtailed by the war. The duration of the award will not normally extend over more than two years or less than three months, and the amount will depend on the nature of the research and the circumstances of the applicant. Forms of application may be obtained from the Secretary, Dr. L. Haden Guest, M.C., M.P., Leverhulme Research Fellowships, Kingscote House, 1 Watergate, Blackfriars, London, E.C.4. Applications must be received on or before March 1, 1941. Awards will be announced in July and will date from September 1, 1941.

The Manufacture of Humus

A New Method of Revivifying Spent Agricultural Land

HUMUS was described by Thaer 120 years ago as " the product of living matter and the source of it." The present views on humus would not perhaps go so far as the latter part of this definition, but there is a growing recognition of the significance of organic matter in agricultural practice, and especially in soil conservation. With the exception of certain bacteria, only green plants containing chlorophyll can synthesise organic matter from simple elements. The animal kingdom uses the plants as food and returns the undigested parts into circulation. This excrement and the bodies of the animals and plants are subject to microbial decomposition with the formation of water and carbon dioxide. The plant remains and animal residues do not become completely mineralised, however. A portion is resistant and remains for a time undecomposed or partly decomposed, and under certain conditions will accumulate, forming what is known as humus. Essential elements such as carbon, nitrogen, phosphorus, sulphur and potassium become locked up in this humus and being thus removed from circulation, the growth of plant life becomes less exuberant. The humus, however, undergoes slow decomposition and thus supplies a slow continuous stream of the elements essential for new plant synthesis. It acts thus as a reserve and a stabiliser for organic life and completes the cycle of growth in nature. Thus, according to the classical theory, humus plays a prominent, if not predominant, role in the formation of most soils. It exerts a variety of physical, chemical, and bio-chemical influences upon the soil, making it favourable for plant growth.

It is important that the rôle of micro-organisms upon the formation and decomposition of humus should be recognised. These organisms bring about its formation from plant and animal residues by a species of fermentation, they transform and finally completely mineralise the humus, and in doing so they themselves grow, die, and contribute directly to the volume of the humus. Unless this action can proceed, most of the available elements essential for plant growth would be stored away as inanimate plant and animal residues. The chemist will recognise that the reactions of oxidation, reduction, hydrolysis and polymerisation are important in the formation and transformation of humus; but the primary agents are the micro-organisms.

Chemical Nature of Humus

Our knowledge of the chemical nature of humus is still in a highly confused state. It is possible to isolate many chemical compounds from it, including paraffin hydrocarbons, sterols, fats, waxes and esters, organic acids of low and high molecular weight, aldehydes, carbohydrates including cellulose, lignins and organic nitrogen, phosphorus and sulphur compounds. All these, however, constitute only a fraction of the total organic constituents, the composition of the remainder being unknown. In general, soil humus consists of 45 per cent. lignin-like complexes, 35 per cent. of protein complexes, 11 per cent. of carbohydrates and 3 per cent. of fats, waxes, and resins. Its composition, however, depends upon the conditions under which it has been formed.

Physically, humus exists in nature as a hydrophil colloid with water as the dispersing medium which is itself adsorbed. This is a highly important factor in the reactions of humus. The stability and properties of the colloid depend largely on the adsorbed medium and less on the electric charge; the colloidal solution is thus not particularly sensitive to added electrolytes. The phenomena of base exchange and base adsorption are explained by the fact that the humus particles are negatively charged and will thus adsorb the positive ion of the added electrolyte. Whilst colloidal suspensions of clay will be stabilised by the colloidal soil humus, calcium or magnesium salts will precipitate the humus colloid. The amount of water and of nutrient salts adsorbed by the colloidal humus system is of great agricultural significance since it is in this system that the major activities takes place. It is now believed by some experimenters that the chief role of humus is to retain water in contact with the growing plants, all plants being aquatic in origin.

Humus occurs naturally in the soil and is, of course, used up in the processes of growth and must be renewed from time to time. It can be renewed by decomposition of the excreta from animals, or of plant remains, and it is renewed in agricultural practice by ploughing grassland from time to time. It may also be added in the form of stable manure or composts. After any of these substances are added to the soil they incur rapid decomposition as measured by the evolution of CO_2 and the disappearance of various organic constituents. The amount of nitrogen liberated in available forms depends largely upon the carbon-nitrogen ratio of the humus —a fact of the utmost significance. If this is greater than 20 the soil cannot support active growth because the bacteria are so occupied in breaking down the carbo-hydrates that the nitrogen is left in unassimilable form. The soil in fact gets a species of indigestion. This nitrogen starvation will be observed as long as there is an excess of carbo-hydrates since the micro-organisms using them as a source of energy assimilate all the available nitrogen that would otherwise become available to the higher plants. When the carbon-hydrogen ratio of the humus is less than 15 there is no tendency to restrict the supply of available nitrogen. The decomposition of humus gives rise to ammonia, which is then converted into nitrates.

Not Essential for Plant Growth

It must be understood that humus is not essential for plant growth. Experiments which are now in progress, for example at Reading University, show that plants can be grown in an entirely inorganic bed such as gravel or even in inorganic solutions. They can obtain their nitrogen, phosphorus, and other essential elements solely from inorganic forces and it would thus seem possible for the human race to exist without the presence of humus. Nature, however, as operating in the ordinary process of agriculture and horticulture in the soil, invariably makes use of humus somewhat in the manner here described.

There is in this country a gap in the cycle of life in that although in the fields the sequence of plant—animal—excrement—humus—plant take place freely, human excrement and habitation refuse generally, does not return to the soil, but is " purified " in sewage works or burnt in refuse destructors and is in short rendered unavailable as humus. A paper read by Lieutenant-Colonel F. C. Temple before the Royal Society of Arts on January 29 last upon the subject of " Municipal Manufacture of Humus from Habitation Wastes " drew attention to this defect in our national economics and indicated methods whereby it could be corrected. Lieutenant Colonel Temple said that man's knowledge of the proper disposal, by utilisation, of waste products, and its influence on water and food supply, has developed slowly, though some of the earliest known public health acts, namely, the Biblical books of Numbers and Deuteronomy, give some regulations that, for similar incidence of population, cannot be improved on to this day. The proper utilisation of waste products is the key to the whole problem of public health, for if it is perfect, the surroundings in which people live will be clean and the air sweet, the water will be good, for there will be nothing to contaminate it, and the soil will be enriched with the best possible fertiliser.

The science of the purification of water has made steadier progress, has suffered fewer set-backs, and appears to have taken fewer wrong turnings, than that of sewage or refuse disposal. It has now been so developed that it is possible to render almost any water fit for domestic use, with certainty, and apparently without causing any deleterious consequences,

direct or indirect, to the consumer. The idea of using water as the vehicle to carry away excreta has simplified the removal so thoroughly that a reversion to any system like the old hand-and-cart removal is unthinkable; but the inception of waterborne sewage has also been the inception of vast troubles in its disposal. Whereas the excreta could be mixed with soil and improve its fertility, the same excreta mixed with water very easily destroyed the fertility of the soil on which it was discharged. Sewage farming has occasionally, but rarely, been really successful.

Solution of the Problem

The solution of this problem is considered by Lieutenant-Colonel Temple and others to lie in the combination of house refuse with sewage sludge in order to form a compost, and the process he advocates has been set to work at Maidenhead by Mr. Sams, working with the Mitchell Engineering Co., and at Leatherhead by the District Council. In both those places unactivated sedimentation sludge has been used, and in both places the results have been remarkably good. The process was publicly advocated by Mr. J. A. Coombs in 1936, and again by him and by Sir Albert Howard in 1938. The most striking features about the process are its simplicity and flexibility. The refuse is screened, picked for large paper, rags, boots, and bottles, passed under a magnetic separator for extraction of tins and iron, and pulverised. The pulverised residue is stacked in heaps some 100 to 200 square feet in area, to a depth of one foot six inches to two feet and a rim of refuse built up round the edge another foot or so. Then sludge from simple sewage sedimentation tanks is run into the saucer so formed, usually three times at about 12-hour intervals. Two days later the heap is turned. It is turned again after four days more, and again after a further four days and still four days later it is taken to the stock heap, where it matures if the farmers have not already taken it away to mature on resting ground. Some of the saucer-shaped stacks are made on old concrete floors; but it is said that they do just as well and possibly better on beaten earth. At Leatherhead the stacks are not roofed, but the heat of fermentation is such that it is said to be more difficult to keep them moist enough than to keep them dry. The essential feature of the process is that the compost must be matured fully before it is used in agriculture. After the process described by Lieutenant-Colonel Temple, the compost should be left for about three months to mature or it can be put on the land three, or preferably six, months before it is required to support a crop. In this way will be avoided the soil indigestion to which previous reference has been made.

At first sight it would appear that the proportion of sewage sludge to refuse would be important and an attempt has been made to compare the quantities used in different places. This has proved to be extraordinarily difficult. The percentage of moisture in the sludge being so variable, the dry matter is the comparable basis for argument. But the information published regarding the average quantity of dry matter produced per head per day varies from Clemesha's figure of 0.16 lb. to Buswell's 0.08 lb. In sewage works it has been estimated variously from 0.1 lb. to 0.07 lb. per head per day. Not only, however, is there a wide discrepancy in these figures, but the proportions of refuse to night-soil actually composted together in four different centres at Indore vary from 10 per cent. to 64 per cent. without apparently breaking the process down. This practice appears to be followed at Leatherhead, the whole of the refuse that comes to hand being composed with whatever sludge is, so to speak, "on tap." There must be limits to the proportions of sewage sludge and refuse which can be composted together successfully; but they are evidently very elastic. The probability is that an ideal condition may be realised in which the whole of the refuse and the whole of the sewage sludge of any community can be mixed together to react on one another with the help of micro-organisms and so complete the life and death cycle to nourish new life.

The cost of conversion in most places will not be great. In almost all sewage works there exist means of extracting sludge and, as simple sedimentation sludge works well, no alteration may be necessary, at first at any rate. In any new works there would appear to be a good case for installing an activated sludge plant for the purification of the liquid sewage, because activated sludge is an excellent flocculator and with its help the maximum sludge could be extracted, perhaps with the help of mechanical flocculation, in preliminary settlement tanks. Moreover, the experiments of Dr. Fowler and Mr. Anstead indicate that the sludge so extracted should form a particularly good ferment for composting the refuse. At most existing works the requirements will be screening, picking, and pulverising apparatus, the cost of which should not exceed £3,000 for a population of 50,000 and rather less proportionately for larger numbers. As soon as the plant has established itself, the sale of humus should more than pay for composting so that the net cost of sewage and refuse disposal should be rather less than at present.

The discussion upon this paper indicated certain difficulties which must be overcome and improvements which must be made in this process. Dr. Parker indicated that there is the greatest difficulty in the disposal of sewage sludge and that if it could be made into a valuable manure it would be a great advance. The difficulties, however, lie in its water content, which may be 95 per cent. In the primary sludge tanks, and in the case of activated sludge which may contain 6 per cent. of nitrogen on the dry basis, the water content will be of the order of 98 per cent. at the works. Since the main charge of any business is transport, with water contents of this order of magnitude transport charges are likely to be proportionately high. Thus the whole problem in his view is resolved into two factors: (1) Can the compost be prepared at a reasonable price and (2) Can it be transported sufficiently cheaply to the farms? In answer to these criticisms Lieutenant-Colonel Temple stated that during the fermentation period the temperature of the compost rises to 160° F. and in this way at least half the water added in the form of sewage sludge is evaporated.

Common Action Needed

Another difficulty is that the house refuse is collected by one department and the sewage disposal is the business of another. Too often there is difficulty in getting the two departments to take common action. The incinerator method of dealing with house refuse was widely condemned, but it was indicated that glass, ashes and paper, the last of which so greatly increases the carbohydrate content and thus increases the carbon-nitrogen ratio, should be removed before the refuse is used in making compost. Lieutenant-Colonel Temple stated that there would be no particular difficulty in purifying the habitation refuse prior to treatment to a greater extent than was done at the present time, and he again emphasised the importance of proper maturing of the compost before use. It was possible to spoil agricultural land completely for a considerable period if this was not done.

An interesting discussion took place upon the liability to disease arising from these composts. One speaker asserted that once the bacteria that caused the formation and decomposition of humus were fully established, no disease germs could live in the humus. The humus could be eaten with impunity and water which had percolated through it could be drunk with impunity. This view did not meet with universal acceptance from the more highly scientific authorities present, but it was nevertheless indicated that disease germs are vulnerable to conditions which did not suit them, and when the temperature in the fermenting compost rises to 160° F. most of these germs will be killed, whilst others apparently die from other reasons at a later stage. In this connection an interesting observation was recalled of a piece of waste ground in India which was treated with humus of the character described by Lieutenant-Colonel Temple, for three years after which cattle were allowed to feed on it for more than 20 years. During the whole of this time, although frequently exposed to contagious and infectious cattle diseases, none of the cattle which lived on this particular plot of land was ever known to contact any of these diseases.

Synthetic Rubber in the Chemical Industries

Specific Applications of Neoprene

by A. E. WILLIAMS, F.C.S.

IN THE CHEMICAL AGE for November 2, 1940, the author described typical compounds of neoprene, the synthetic rubber manufactured by I.C.I., Ltd., together with some of its general uses. The following deals with some other of its properties and specific applications of neoprene in the chemical industries.

For the benefit of those who have not yet had an opportunity of examining neoprene goods it may be said that compounded and vulcanised neoprene resembles natural rubber in appearance, elasticity, resilience, strength and abrasive resistance. Physically it is at least equal to rubber for it may be compounded to give a tensile strength of around 4000 lb. per sq. in., while its elastic properties are demonstrated by the fact that it can be made to show an elongation at break of 1000 per cent. The user of chemical plant, however, is interested primarily in its resistance to chemical corrosion, both acid and alkaline, to oils and fats, and to heat; and in these directions it is superior to natural rubber. For example, rubber cannot generally be used at temperatures higher than 150° F., but neoprene compounds are unaffected up to 300° F. The latter have also a lower permeability towards gases, a lower water absorption, and a stronger resistance to oxidation. Ageing tests on rubber may be accomplished by means of a thermostatically-controlled oven, which, in a short period, gives a reliable indication of the probable length of life of the rubber. In the I.C.I. laboratories a series of tests was carried out at three different

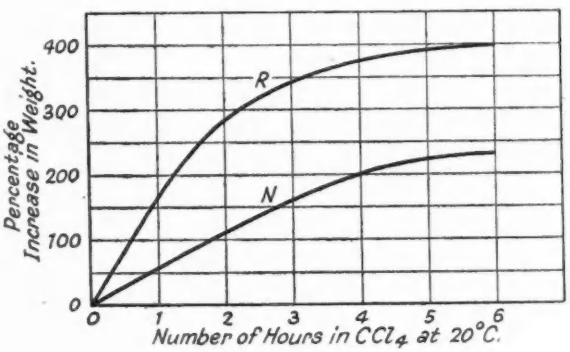

Fig. 1

temperatures, viz., 70°, 100° and 140° C. respectively, using comparable neoprene and rubber compounds. The following table shows the result of these tests.

Oven Temp. C.	Ageing Time	Neoprene	Rubber
70°	12 weeks	Hardly affected	Showing rapid deterioration
100°	3 ,,	Definite deterioration	Completely perished
140°	8 hours	No marked deterioration	Useless

From these characteristics it is evident that there is a useful sphere of work for neoprene in the chemical industries, especially where the more vulnerable rubber has been previously used.

The following table gives some idea of the chemical resistance of rubber, together with the maximum temperature permissible for efficient working. In the case of neoprene compounds at least 50° F. may be added to the temperatures given for rubber without impairing the properties of the neoprene. Thus the greater resistance of the synthetic material enables it to be used in plant construction for processes operated at relatively high temperatures, wherein natural rubber would be useless. Whereas with natural rubber severe corrosive influences call for the use of hard rubber (ebonite), neoprene itself is serviceable in most of these circumstances, but in certain cases the modified form of neoprene, flexible ebonite, is preferred, for this has a higher resistance than ordinary neoprene and is flexible. In the table H= hard rubber and S= soft rubber.

CHEMICAL RESISTANCE OF RUBBER.

Substance	Concentration	Maximum Working Temperature, F.
Acetic Acid	Any	145° H
Arsenic Acid	Any	145° S
Carbonic Acid	Up to saturation	145° S
Citric Acid	Up to saturation	150° S
Formic Acid	Any	90° H
Hydrochloric Acid	Any	150° H
Hydrobromic Acid	Any	90° H
Hydrofluoric Acid	Up to 50 per cent.	120° H
Phosphoric Acid	Up to 70 per cent.	140° H
Sulphuric Acid	Up to 50 per cent.	100° H
Tannic Acid	Up to saturation	145° S
Tartaric Acid	Up to saturation	150° S
Sodium Hydrate	Saturated solution	140° S
Pot. Hydrate	Saturated solution	140° S
Vegetable Oils	—	140° H
Mineral Oils	—	90° H
Soap Solutions	Any	140° S

This list by no means exhausts the numerous substances against which rubber or neoprene are serviceable, but some materials in the solvent class have a very deteriorating effect on both rubber and neoprene, although the latter has a higher resistance than the rubber. These solvents include benzine and analogous hydrocarbons, turpentine and other terpenes, and such chlorinated solvents as carbon tetrachloride. With this class of solvents it is not practicable to use either rubber or neoprene. The accompanying graph (Fig. 1), from the work of Dr. W. J. S. Naunton, shows the behaviour of natural rubber and neoprene when immersed in cold carbon tetrachloride. Within six days the rubber shows a weight increase of 400 per cent., compared with about 230 per cent. for neoprene. Increase in weight is accompanied by swelling of the rubber and neoprene, involving a loss of their normal characteristics and eventual complete disintegration.

As mechanical drying is cheaper than thermal drying, centrifugal machines are always in demand for removing moisture from crystals, etc. The baskets of these machines are sometimes lined with ebonite with the object of preventing corrosion of the metal basket by the product and the contamination of the latter by the metal. It is practically essential when handling corrosive substances in centrifuges to have either a basket of expensive metal or an ordinary steel one lined with hard rubber or other protection. If such precautions are not taken the basket becomes weakened through corrosion, and as it is subjected to a great strain when rotating at a high speed, progressive corrosion may lead to serious accidents. These baskets can now be covered with an appropriate neoprene compound or with flexible ebonite. These have the advantage of a much longer life and are not subject to mechanical damage to the same extent as brittle ebonite. A longer life means also avoidance of lost time in the factory while the centrifuges are dismantled for rubber treatment.

In filter presses the iron plates may be covered with a thin layer of a neoprene compound to prevent corrosion of products from the iron. In such an instance neoprene, apart from being more resistant to corrosion, is decidedly better than rubber; for with the latter the output of the press is much reduced owing to the low working temperature permissible. With many types of product requiring filtration an increase of, for example, 30° F. in the filtration temperature will mean a 100 per cent. increased output from the

press. In a chemical factory containing six or more large-size filter presses the annual bill for filter cloth will run into several thousand pounds. Surprising as it may seem, the cloth costs far more than the presses themselves, but ordinary twill filter cloth can be impregnated with neoprene, which covers and protects the cotton fibres without any loss of porosity. This neoprene-treated fabric also prevents the press-cake adhering to it, so that scraping of the cloths, with the accompanying inevitable tearing of them, is avoided.

Fans and blowers coming into contact with corrosive gases are conveniently treated with neoprene, and the low permeability of neoprene towards gases and vapours, compared with rubber, ensures it a much longer life. Both centrifugal and plunger pumps may now be lined with neoprene and these lined pumps are particularly useful in the pumping of pharmaceutical products which are readily contaminated by contact with metal; besides preserving the latter, neoprene saves process time lost during the repair of corroded pumps. In fans, blowers and pumps handling gritty particles intermingled with a corrosive gas or liquid, the abrasive resistance of neoprene is higher than that of rubber, although the two may have the same resistance initially. This is because the rubber is more affected by corrosive action than is neoprene, and the rubber thus soon loses its resistance properties.

Ebonite pipe lines and steel pipes lined with rubber have been in use in the pharmaceutical and chemical trades for a decade or more. The main disadvantage of an ebonite pipe-line is that it is so vulnerable to mechanical injury; one accidental knock may cause the stoppage of a vital part of a plant for a considerable time. On the other hand, a knock will not damage a neoprene flexible ebonite pipe line any more than a kick damages a motor car tyre. Furthermore, the flexible ebonite pipe line is more resistant to corrosion than is any natural rubber ebonite. In considering the lining of steel pipes with rubber or neoprene the advantage again lies with the latter, for the pipe system would not have to be dismantled for relining so frequently if neopene-lined. At one time rubber-lined steel pipes gave much trouble at the joints, since it was not a simple matter to make an effective joint to keep the liquid from touching the metal. This difficulty has been overcome and special types of joint are now available, as also are neoprene-lined valves and cocks.

The introduction of neoprene has made feasible the lining of dryers and evaporators where the corrosion problem exists. Rubber has only a very limited application in this direction owing to its vulnerability to heat. When the dryers are operated under high vacuum, however, there arises the problem of how to keep the rubber or neoprene firmly attached to the metal. The makers of neoprene have developed a special technique for the firm bonding of neoprene to metal and this appears to overcome the difficulty. Another method has been suggested (B.P. 331,838) to overcome the sucking of the rubber from the metal by using a double-walled vessel with a large number of small holes perforated in the inner shell of the evaporator. In this way when vacuum is created in the space between the two shells the pressure will be equal and the tendency for the vacuum to draw the rubber off the metal nullified. The lining of jacketed pans with neoprene is a more practical proposition than lining with rubber, for here we have to consider thermal conductivity and heat transfer from the space in the steam jacket through the metal and rubber to the pan contents. In general both rubber and neoprene may be regarded as heat insulators, but uncompounded neoprene shows 28 per cent. more thermal conductivity than rubber. The use of carbon black in the compounding ingredients increases the thermal conductivity of both rubber and neoprene, but the latter still scores heavily over rubber because it has a big margin with which to start.

In dry grinding operations neither rubber nor neoprene can be used, but in the lining of ball mills for wet grinding they are both applicable. They are usually applied to the lining of such a mill in slabs, from half to one inch thickness, and having a stiff backing of fabric. Unless, however, the products being treated in the mill are of a corrosive nature, there is no advantage in using synthetic material, for rubber is as good as neoprene in the absence of corrosion, heat, or other deleterious influences.

A Chemist's Bookshelf

PLASTICS IN INDUSTRY. By "Plastes." London, Chapman and Hall. Pp. 241. 12s. 6d.

In their introduction ("Plastes" cloaks the identity of at least two writers) the authors express the hope that this book will give industrialists a clear conception of the many-sided business of the manufacture of plastics and of the fields in which it may legitimately be expected that plastics can be used to maximum advantage. Unfortunately the book (according to the wrapper) is also expected to be of equal interest to chemists and moulders. Now a short treatise reconciling the diverse requirements of industrialists, chemists and moulders would be little short of miraculous. We may consequently ignore this extravagant claim.

The work can, nevertheless, be described as an admirable attempt to popularise the science of plastics and the authors are to be congratulated in discharging from this angle a difficult task with considerable success. In other words we have here a broad presentation in attractive and non-technical style of the manufacture and properties of the principal plastics on the market and of their applications to many industries. The book appears to have been begun in 1939 and completed early in 1940 and is thus reasonably up to date. Illustrated by 32 well-selected plates, it includes examples of recent uses of acrylic resins, nylon, cellulose esters, polystyrene, phenolic resins, urea resins and resin-impregnated woods and papers in the fabrication of such diverse products as motor-cars, textiles, aircraft, chemical plant, gear wheels, radio cabinets and dentures. Of particular interest at the present juncture is the chapter covering the function of plastics in aircraft construction.

The following comments and criticisms are offered mainly from the standpoint of the chemist. Rather more space might have been given to explaining how the chief plastics materials differ from each other. This could have been done with the aid of a few chemical formulæ (which are entirely lacking). Perspex (polymethyl methacrylate) is described in one place (p. 124) as the lightest of all plastics (sp. gr. 1.19), whereas polystyrene with sp. gr. 1.05 (as correctly given on other pages) is the lightest. Ethyl cellulose (sp. gr. 1.2) is comparable to polymethyl methacrylate in this respect, but this fact is omitted. In describing the various rubber-like plastics and vinyl resins the authors fail to make the all important point that nearly all these products are now made by copolymerisation of two or more substances. Copolymerisation is now so immensely important that a true perspective of the modern plastics industry cannot be achieved if it is ignored. Perbunan (p. 171) is thus a copolymer of butadiene and acrylonitrile; vinyon is a copolymer of vinyl acetate and vinyl chloride; in fact the recent patent literature teems with examples of copolymer resins. Incidentally, vinyon (which the authors describe as "apparently a derivative of vinyl acetate") is the first all-synthetic textile resin and not nylon (as asserted on p. 133). Neoprene should have been described as a chlorobutadiene and the opportunity might have been taken of stressing the importance of emulsion polymerisation in the manufacture of this and other butadiene and acrylic plastics.

These errors and omissions do not, of course, detract from the general educative value of the book, although this would be greatly enhanced by careful revision for future editions.

Propiolic Acid

A New Source for Acrylic Plastics

PROPIOLIC acid readily undergoes conversion into acrylic acid or chloracrylic acid, but it is only recently that this route to the important acrylic plastics has been closely investigated. Some years ago the notable discovery was made that the sodium addition product of naphthalene readily reacts with acetylene to form sodium acetylide which in turn is easily converted into propiolic acid by combination with carbon dioxide (U.S.P. 2,171,868 and 2,194,363: Du Pont de Nemours).

An improved process making for greater safety in working with sodium acetylide, which is highly explosive when dry, has now been developed in the Union Carbide and Carbon Research Laboratories and forms the subject of U.S.P. 2,205,885/1940. It takes advantage of the solubility of carbon dioxide in water-soluble ethers, such as dioxan and diethylene glycol diethyl ether, under pressure. In an example of the employment of dioxan as the reaction medium, a suspension of 2880 gm. sodium acetylide in 10 gal. dioxan was stirred for 20 hours with carbon dioxide under a pressure of 500 lb./sq. in. at 15-25° C. The suspension of sodium propiolate was filtered and the filter-cake dissolved in 15 litres water. Treatment with sulphuric acid, followed by extraction with ether, gave a solution from which the ether could be distilled off to leave a constant boiling mixture of propiolic acid and dioxan. The acid could be finally recovered as the pure sodium salt by neutralising with caustic soda and distilling off the dioxan as a constant boiling mixture with water.

New Control Order

Molasses and Industrial Alcohol

THE Control of Molasses and Industrial Alcohol (No. 11) Order, 1941, made by the Minister of Supply, comes into force on February 10, 1941. All existing provisions for the control of molasses and industrial alcohol are now brought together in one Order, but apart from increases in maximum prices, no change has been made. The new Order permits certain increases in the maximum prices which may be charged for molasses other than those used solely for the purpose of food for livestock. These increases are occasioned by the advance in the cost of freights. The Order also allows the existing maximum prices for industrial alcohol to be increased by 2½d. per proof gallon, this increase reflecting the higher cost of molasses to the manufacturer. The maximum prices for methylated spirit and for certain solvents have also been increased. Further information may be obtained from the Molasses and Industrial Alcohol Control, Great Burgh, Epsom, Surrey. (Telephone, Burgh Heath 3470).

LETTER TO THE EDITOR

Plasticisers for Polystyrene

SIR,—In his article entitled "The Plastics Industry in 1940," published in your issue of January 11, Dr. Barron states that the search for the ideal plasticiser for polystyrene has not yet met with success.

While it is true that the plasticiser for this thermo-plastic material has to be chosen with some regard for the use to which the plasticised material is to be put, we want to draw your attention to a material which we have developed especially as a plasticiser for our distrene brand polystyrene. The product, which we call polymeth, is a hydrocarbon plasticiser and has proved eminently suitable for distrene intended for electrical insulation work, and for distrene for media for luminous paints. Its incorporation in distrene does not impair the chemical resistant properties of the plastic.—Yours faithfully,

British Resin Products, Limited.
H. H. WOOLVERIDGE,
Managing Director.

Epsom, Surrey.
January 30, 1941.

Importation of Starch Products

Merseyside Producers' Difficulty

AT the annual meeting on January 31 of Liverpool Seed, Oil, Cake and General Product Association, whose membership comprises all the Merseyside cattle food manufacturers, reference was made to the difficulty experienced by members in securing licences for the importation of starch products under the Import of Goods (No. 12) Order, 1940. It was stated in the annual report that Mr. H. J. Hall, chairman of the Farinaceous Products Sub-Committee, formed one of a deputation including representatives of the Farinaceous Products Association of Manchester to interview the Director of Starch Supplies. The serious delay, inconvenience and expense resulting from the procedure then in operation were emphasised and as a result a system of block licences based on pre-war imports was introduced. For a time matters went smoothly, but with the advent of fuller control of farina, further difficulties arose. Acting in co-operation with the Farinaceous Products Association and the Association of Dextrine Manufacturers, another deputation waited on the Director of Starch Supplies, but very little satisfaction could be obtained. Regret was expressed in the report that the Starch and Dextrine (Control) Order, 1940, makes no provision for the broker. The sub-committee of the Association continues to watch the position in the hope of securing some amelioration.

Mr. E. E. Billington, who presided, said: "Some measure of Government control may be expected to become permanent, coupled with a policy of 'carry-over' and stability of price. The gradual organisation of businesses into large groups or service monopolies is an obvious invitation for the Government to take them over. This will have far-reaching effects upon other trades than those immediately concerned, and will fit in with the measures of permanent control I have just mentioned. In some quarters there is a tendency to think that intermediaries in trade are entirely parasitic; we who are in business know that trade is so widespread that it would be impossible to carry on without them. It is my opinion that in nearly every case an intermediary is giving some genuine service or competition would have eliminated him long ago."

The China Clay Situation

Points from Lord Aberconway's Speech

THE situation of the china clay industry was aptly described by the Right Hon. Lord Aberconway, C.B.E., at the recent annual general meeting of English Clays, Lovering, Pochin and Co., Ltd.

In normal conditions overseas shipments represented 60 per cent. of the company's total trade. During the first half of the year overseas trade was well maintained, but during the latter half, as a result of the entry of Italy into the war and of the occupation of N.W. Europe by Germany, the overseas trade of the company fell 47 per cent., while assets in and debts owing from these countries had also had to be written off. Through the company's prudence certain reserves against such bad debts had been made in past years, and a substantial recovery of debts from Spain was made available as an offset, otherwise the burden would have been very much heavier. Not only had the company's foreign trade declined, but the home trade also fell off by no less than 38 per cent., largely as a result of the severe rationing of the paper trade, which was its best customer. This meant the closing down of many works, but that too entailed expense as the pits had to be kept free from water and the minimum rents paid. Lord Aberconway paid a high tribute to the research department of the company.

"An Unusual Pump Test Experience" is described in the current issue of the Allen Engineering Review, which also contains a number of other articles of interest. MESSRS. W. H. ALLEN, SONS AND CO., LTD., Bedford, are the publishers.

Personal Notes

MR. A. HARDY recently resigned from the board of Stevinson, Hardy and Co., Ltd., oil importers.

DR. R. CUTHILL, M.Sc., Ph.D., who was appointed head of the chemistry department of Bolton Municipal Technical College about 18 months ago, has been elected to a Fellowship of the Institute of Chemistry.

MR. JOHN A. ORIEL, M.C., M.A., F.Inst.Pet., manager of "Shell" Refining and Marketing Co., Ltd., has been nominated as a member of the Council of the Institution of Chemical Engineers for the ensuing year.

MR. CHARLES LATHAM, chairman of London and Thames Haven Oil Wharves, has been reappointed a member of the London Transport Passenger Board for a further period of 3 years. He has been a member of the board since 1935.

MR. AND MRS. GEORGE GARRIMOND celebrated the diamond wedding on February 2. For over 40 years Mr. Garrimond, who is now 87, was proprietor of Garrimond's Chemical Works, Church, Lancs., and he also had interests in the chemical trade in Glasgow.

CAPT. DICK YELLAND, a well-known figure in the Cornish china clay industry, has been presented by Mr. A. J. Davies, joint managing director of English Clays, Lovering, Pochin & Co., with an electric clock and lamp from the men at Hendra clayworks, Nanpean, where he has been employed for 60 years.

MR. R. LLOYD ROBERTS, whose services have been made available by Imperial Chemical Industries, has been appointed to assist Mr. F. W. Leggett, Chief Industrial Commissioner, in taking charge of the Ministry of Labour Departments dealing with welfare and the administration of the Factory Acts, as well as the Industrial Relations Department.

MR. EDWARD HERBERT CLIFFORD has been elected president of the Institution of Mining and Metallurgy for the year 1941-2. Mr. Clifford is consulting mining engineer to the British South Africa Company, and was recently co-opted as a member of the departmental committee lately set up by the Ministry of Supply to inquire into the possible increased production of non-ferrous ores in the United Kingdom.

OBITUARY

The death has occurred at Glasgow of MR. HERBERT L. WATSON, B.Sc., who for many years was associated with Messrs. Ogston and Tennant, Ltd., soap manufacturers, Glasgow, a firm of which his late father was managing director. Mr. Watson, who was an analytical chemist, was a member of the Glasgow Committee of the Society of Chemical Industry and a governor of Paisley Technical College.

SILVER ORES, CONCENTRATED AND RESIDUES

The Board of Trade announce that the open general licence permitting the importation without further licence of silver ores, concentrates and residues has been revoked as from February 5, 1941. Separate licences are now necessary except in respect of goods which are proved to the satisfaction of H.M. Customs and Excise to have been despatched to the United Kingdom before February 5, 1941, and which are imported into this country before April 5, 1941. Applications for licences should be addressed to the Import Licensing Department, 25 Southampton Buildings, London, W.C.2.

THE RESEARCH ASSOCIATION OF BRITISH RUBBER MANUFACTURERS, 105-7 Lansdowne Road, Croydon, has issued a brochure describing its work. Although founded with the primary object of studying problems of interest to manufacturers, the Association has extended its scope to provide technical and general assistance to suppliers of raw materials and users of rubber products as well as to rubber manufacturers.

Chemical Matters in Parliament

Fortified Flour

IN the House of Commons on January 29, Mr. Leach asked the Parliamentary Secretary to the Board of Trade, as representing the Ministry of Food, whether white flour unadulterated with vitamin B and calcium salt will be available after the fortified white flour is put on the market; and whether the fortified white flour will be labelled to show that chalk and a chemical substance have been mixed with it?

Major Lloyd George: The decision announced on behalf of the Government in the House on July 18 last concerned the addition of vitamin B1 and a calcium salt to white flour used for bread making. No decision has yet been reached on the question of similarly fortifying all white flour.

Mr. Leach: Is there any intention to have a label so that people may know what they are getting?

Major Lloyd George: If the decision was that all white flour should be so fortified, it would not arise, but if some white flour is not fortified, then a label would probably be desirable.

On Tuesday, when it was announced that a standard wholemeal loaf, made of flour of 85 per cent. extraction, would be on sale soon, it was stated that flour reinforced with calcium salt and manufactured vitamin B1 would not be available for some months.

Tung Oil

Also on January 29, Sir Leonard Lyle asked the Minister of Economic Warfare whether he is aware of the large quantity of tung oil now being exported from China to Russia; and what is its use, and the ultimate destination of such oil?

Mr. Foot: The Chinese Government have kept His Majesty's Government regularly informed of the shipments of tung oil made to the Soviet Union under the Sino-Soviet Barter Agreement, and I am satisfied that the quantities supplied are not excessive. The principal use of tung oil is for the paint and varnish industry, and His Majesty's Government have received categorical assurances, from both the Chinese and Soviet Governments, that this tung oil is for use within the Soviet Union, and will not be re-exported.

Chemicals Liable to K.I.D.

Open General Import Licence Revoked

HITHERTO, chemicals liable to Key Industry Duty could be imported under an open general licence except (a) synthetic organic dyestuffs and organic intermediate products used in the manufacture of such dyestuffs, and (b) a number of specified chemicals set out in a list in Notice to Importers No. 106. This open general licence has now been revoked, the revocation taking effect on February 5, 1941, and all chemicals to which it applied will now require separate licences unless they are proved to the satisfaction of H.M. Customs to have been despatched to this country before February 5, and are imported before April 5, 1941.

Applications for licences to import chemicals which now become subject to licence for the first time should be made in duplicate to the following addresses: Urea, the Molasses and Industrial Alcohol Control, Great Burgh, Epsom, Surrey; acid calcium phosphate (calcium biphosphate), Ministry of Food, Room 17, Metropole Hotel, Colwyn Bay; molybdenum compounds, tantalum compounds, tungsten compounds and vanadium compounds, Iron and Steel Control, Steel House, Tothill Street, London, S.W.1; all others, Import Licensing Department, Board of Trade, 25 Southampton Buildings, Chancery Lane, London, W.C.2.

Applications for licences to import chemicals already subject to licence should be submitted to the addresses shown in Notice to Importers No. 106, except that applications for acid sodium pyriophosphate should now be submitted (in duplicate) to the Ministry of Food, Room 17, Metropole Hotel, Colwyn Bay. All applications for licences to import chemicals liable to K.I.D., whether previously subject to licence or not, should in future be made in duplicate.

General News

THE SCOTTISH TAR DISTILLERS, LTD., are investing £10,000 in Falkirk's War Weapons Week.

CONTRIBUTIONS MADE BY EMPLOYEES of the Carron Company, Ltd., last year, to local infirmaries and institutions and to special war charities, totalled £4376.

AS FROM FEBRUARY 1, 10,000 Scottish flax workers received a 7½ per cent. increase in wages. A similar increase may be fixed soon for Dundee jute workers.

THE MINISTRY OF FOOD announces that there will be no change in the existing prices of oils and fats allocated to primary wholesalers and large trade users for the four weeks ending March 1.

AN ABRASIVE PAPERS AND CLOTHS EXPORT GROUP has been formed, with Mr. C. G. Oakey as chairman. The secretary is Mr. R. W. Young, Emery Trades Association, 29 and 30 Broad Street Avenue, London, E.C.2.

SIR ANDREW DUNCAN, Minister of Supply, has received through Lord Nuffield a shipment of five tons of soft rubber. The donors control rubber estates in the Federated Malay States, and their gift is a contribution to the Empire war effort.

EMPLOYEES OF THE STEEL COMPANY OF SCOTLAND, LTD., Glasgow, have presented an ambulance wagon to the St. Andrew's Ambulance Association. They are presenting a mobile canteen to the Y.M.C.A.

THE DIRECTORS of Benn Brothers, Limited, publishers of THE CHEMICAL AGE, have declared the following dividends, less tax, payable on February 15, 1941, viz.: 3 per cent. on the preference shares for the half-year ended December 31, 1940, and interim dividend of 4 per cent. on the ordinary shares (same).

ON A CHARGE of contravening the Factory Acts, Scottish Tar Distillers, Ltd., chemical manufacturers, Falkirk, were fined £5, with £2 17s. 6d. costs, at Falkirk Sheriff Court last week. The charge arose out of a fatal accident at the works on October 14 last, when a workman, Samuel Douglas, was found dead in a tar pre-heater, death being due to asphyxia from fumes.

DAMAGE ESTIMATED AT £10,000 was caused by an outbreak of fire early on January 30 in the works of the Seedhill Finishing Co., Ltd., dyers and finishers, Seedhill, Paisley. The seat of the fire was a 170 feet long drying store, which was destroyed together with a large quantity of cloth and machinery, but production in the works will not be seriously affected.

THE COUNCIL OF THE UNIVERSITY OF BIRMINGHAM announce in their annual report to the Senate, who will meet shortly, that an anonymous donor has entered into a deed of covenant with the University, for a period of seven years, to provide a valuable fellowship in chemistry to be known as the Chamberlain Research Fellowship. Through the good offices of Mr. Charles Brotherton two post-graduate scholarships, each of the value of £150 per annum, are available from the Brotherton Trust for students in the Department of Chemistry.

THE BOARD OF TRADE RETURNS for December, 1940, show that imports of chemicals, drugs, dyes and colours into the United Kingdom were valued at £915,009, a decrease of £554,437 compared with December, 1939. Exports were valued at £1,529,754, a decrease of £957,516 on the previous December, while re-exports, at £26,002, showed a decrease of £9,743. For the year ended December 31 last, however, imports increased in value by £1,149,038 to £17,069,227; exports, at £27,669,786, showed an increase of £4,881,601; and re-exports increased by £123,556 to £596,976.

THE COMMERCIAL SECRETARY to His Majesty's Embassy at Cairo reports that the Ministry of Finance, Survey and Mines Department is calling for tenders (Contract No. 2-4/25) for the supply and delivery during the year 1941-1942, of 14,450 tins of developing powder and 18,455 tins of acid fixing powder. Tenders, endorsed "Tender for Chemicals," should be addressed to the Controller-General, Survey Department, Giza (Orman), Egypt, by whom they will be received up to 12 noon, on April 1, 1941. A specimen copy of the specifications and general conditions of tender, together with drawings, are available from the Department of Overseas Trade, Millbank, London, S.W.1.

Foreign News

IMPORTS OF ACETONE into Argentina increased sharply in 1939 to 287,747 kilograms from 55,168 kilograms in the previous year.

From Week to Week

A NEW FACTORY is to be erected at Dudley Park, South Australia by Beckers (S.A.) Pty., Ltd., wholesale chemists. One of the major products of the new factory will be caffeine, a drug hitherto wholly imported.

SULPHUR EXPORTS from Chile in the first nine months of 1940 totalled 21,962 metric tons, all of which went to other South American countries. Exports to Argentina totalled 16,125 tons, to Brazil 4742 tons, to Uruguay 1000 tons and to Peru 95 tons.

SODIUM SULPHATE EXPORTS from Chile in the first nine months of 1940 totalled 8098 metric tons, of which 5545 tons went to the United States, 2242 tons to Brazil, 192 tons to Peru, 102 tons to Argentina, 10 tons to Bolivia, and 7 tons to Equador.

GLYCERINE IMPORTS INTO EGYPT during the first half of 1940 amounted to 25,149 kg., valued at £E.1739, a continuation of the decline noted during the first quarters of 1939 and 1938 when imports were, respectively, 27,195 (£E.1343) and 37,724 kg. (£E.2541).

PRODUCTION OF COPPER SULPHATE has been commenced by the N. V. Chemische Industrie en Handel Mij. (Chemical Industry and Trading Co., Ltd.), at Sepandjang, near Sourabaya, East Java. Copper sulphate has not previously been manufactured in the Dutch East Indies.

THE STATE-OWNED Rikkihappo ja Superfosfaattitehtaat O/Y (Sulphuric Acid and Superphosphate Mills Co., Ltd.), Finland, recently announced that it would construct a new sulphuric and hydrochloric acid plant, as well as a sodium sulphate and superphosphate factory at Kokkola, provided that machinery could be obtained for the manufacture of these chemicals.

FIRST PRODUCTION of copper sulphate in the Dutch East Indies has been started by the N. V. Chemische Industrie en Handel Mij. This company, located near Sourabaya, Java, is controlled by Netherlands capital and has been a manufacturer of other chemicals since its establishment in 1912. Plans for another plant, in the same colony, for the production of aluminium sulphate, have likewise been completed, according to press reports.

Forthcoming Events

ANOTHER SPECIAL AFTERNOON LECTURE for members of the Royal Institution of Great Britain and their friends will be given on "Explosives" by Dr. G. I. Finch, Professor of Allied Physical Chemistry, Imperial College, London, at the Royal Institution, 21 Albemarle Street, London, W.1, on February 11, at 2.30 p.m.

A MEETING OF THE Institute of Fuel will be held at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2, on February 12, at 2.15 p.m. Mr. John D. Troup will present a paper entitled "Some Notes on a Post-war National Fuel Policy with Suggestions for a Practical Plan." This paper will be followed by a discussion.

AN ADDRESS, entitled "Early English Materia Medica Cabinets in Cambridge," will be given by Mr. E. Saville Peck, D.L., M.A., at a meeting of the Pharmaceutical Society of Great Britain in the Society's House on February 12 at 2.30 p.m. The lecture will be illustrated with lantern slides and some of the contents of three of the cabinets. Tea will be served after the meeting.

THE ANNUAL DINNER of the North of England Institute of Mining and Mechanical Engineers will be held in the Banqueting Room of the Royal Station Hotel, Neville Street, Newcastle-upon-Tyne, on February 14, at 7 for 7.30 p.m.

AT A JOINT MEETING of the Institution of Civil Engineers with the British Section of the Societe des Ingenieurs Civils de France, at the Institution's premises, Great George Street, Westminster, London, on February 18, at 1.30 p.m., a paper entitled "Further Data Concerning Pre-stressed Concrete: Comparison between Calculated Stresses and Stresses Registered during Tests," will be read by T. J. Gueritte, B.Sc. Light refreshments will be served at 12.30 p.m.

A PAPER on "Art and Science in Paper Manufacture" will be read by Dr. Julius Grant, M.Sc., Ph.D., F.I.C., chief chemist to Messrs. John Dickinson and Co., Ltd., at a meeting at the Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2, on February 19 at 1.45 p.m.

Weekly Prices of British Chemical Products

TAKING the general chemical market as a whole, trade during the past week has been fairly active and at the consuming end somewhat substantial quantities have been called for against existing commitments. In regard to the price position there have been no important changes in home makers' prices, which continue steady. The demand for the soda products has been fully maintained, the chief interest being displayed in yellow prussiate, bichromate and liquid caustic. Chlorate of soda is noted to be coming in for more attention. Most of the heavy acids are in active demand at recently quoted values. A steady trade is being put through in most sections of the coal tar products markets and quotations on the whole are moving within narrow limits. Both naphthalene and cresylic acid are enjoying a reasonable export trade.

MANCHESTER.—Trading conditions generally during the past week have been reasonably satisfactory from the point of view both of fresh bookings and of deliveries into consumption. A moderate volume of export inquiry has also been dealt with. Home users are specifying for fair contract quantities of most of the leading "heavies," especially for the cotton and woollen and allied industries. Quotations generally maintain their firmness. In the tar products section crude tar, creosote oil, and the light distillates are meeting with an active demand and values are strong.

GLASGOW.—Conditions in the Scottish heavy chemical market remain normal, with prices keeping firm.

Price Changes

Rises: Ammonium Chloride, Antimony Sulphide, Bleaching Powder, Cadmium Sulphide, Calcium Chloride, Carbolic Acid, Chlorine Liquid, Creosote, Dinitrobenzene, Glycerine, Naphtha, Nitric Acid, Soda Caustic, Sodium Bisulphite Powder, Sodium Sulphate (Salt Cake), Sodium Sulphide, Sodium Sulphite, Xylol.

Falls: Ammonia Anhydrous, Carbon Black, India Rubber Substitutes, Pyridine, Sodium Bicarbonate, Sodium Sulphate (Salt Cake).

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton £36 10s.; 10 cwt./1 ton, £37 10s.; 4/10 cwt., £38 10s.; 80% pure, 1 ton, £38 10s.; 10 cwt./1 ton, £39 10s.; 4/10 cwt., £40 10s.; commercial glacial, 1 ton, £46; 10 cwt./1 ton, £47; 4/10 cwt., £48; delivered buyers' premises in returnable barrels. £4 per ton extra if packed and delivered in glass.

Acetone.—Maximum prices per ton, 50 tons and over, £52 10s.; 10/50 tons, £53; 5/10 tons, £53 10s.; 1/5 tons, £54; single drums, £55, delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each; delivered in containers of less than 45 gallons but not less than 10 gallons £10 10s. per ton in excess of maximum prices; delivered in containers less than 10 gallons each £10 10s. per ton in excess of maximum prices, plus a reasonable allowance.

Alum.—Loose lump, £9 10s. per ton, d/d, nominal.

Aluminium Sulphate.—£8 to £8 10s. per ton d/d.

Ammonia Anhydrous.—Spot, 11½d. per lb.

Ammonium Carbonate.—£39 to £40 per ton d/d in 5 cwt. casks.

Ammonium Chloride.—Grey galvanising, £22 10s. per ton, in casks, ex wharf. Fine white 98%, £19 10s. per ton. MANCHESTER: Grey galvanising, £22 per ton. See also Salammoniac.

Antimony Oxide.—£68 per ton.

Arsenic.—99/100%, about £31 10s. per ton, ex store.

Barium Chloride—98/100%, prime white crystals, £11 10s. 0d. to £13 per ton, bag packing, ex works; imported material would be dearer.

Bleaching Powder.—Spot, 35/37%, £10 7s. 6d. per ton in casks, special terms for contract.

Borax, Commercial.—Granulated, £26; crystals, £27; powdered, £27 10s.; extra fine powder, £28 10s.; B.P. crystals, £35; powdered, £35 10s.; extra fine, £36 10s. per ton for ton lots, in free 1-cwt. bags, carriage paid in Great Britain. Borax Glass, lump, £73; powder, £74 per ton in tin-lined cases for home trade only, packages free, carriage paid.

Boric Acid.—Commercial, granulated, £42 10s.; crystals, £43 10s.; powdered, £44 10s.; extra fine powder, £46 10s.; large flakes, £55; B.P. crystals, £51 10s.; powdered, £52 10s.; extra fine powdered, £54 10s. per ton for ton lots in free 1-cwt. bags, carriage paid in Great Britain.

Calcium Bisulphite.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid, £5 15s. per ton ex store.

Charcoal Lump.—£10 10s. to £14 per ton, ex wharf. Granulated, supplies scarce.

Chlorine, Liquid.—£21 7s. 6d. per ton, d/d in 16/17 cwt. drums (3-drum lots); 5½d. per lb. d/d station in single 70-lb. cylinders.

Chrometan.—Crystals, 4½d. per lb.; liquor, £19 10s. per ton d/d station in drums. GLASGOW: Crystals 4d. per lb. in original barrels.

Chromic Acid.—1s. 2d. per lb., less 2½%; d/d U.K. GLASGOW: 1s. 0½d. per lb. for 1 cwt. lots.

Citric Acid.—1s. 2d. per lb. MANCHESTER: 1s. 6d.

Copper Sulphate.—About £29 10s. per ton f.o.b. MANCHESTER: £28 10s., less 2 %, in 5 cwt. casks f.o.b. Liverpool.

Cream of Tartar.—100%, £10 2s. per cwt., less 2½%, d/d in sellers' returnable casks.

Formaldehyde.—£21 15s. to £25 per ton d/d. MANCHESTER: 40%, £24 to £25 per ton in casks d/d; imported material dearer.

Formic Acid.—85%, £17 per ton for ton lots, carriage paid, carboys returnable; smaller parcels quoted up to 50s. per cwt., ex store.

Glycerine.—Chemically pure, double distilled, 1,260 s.g., in tins, £3 15s. to £4 15s. per cwt., according to quantity; in drums, £3 7s. 6d. to £4 1s. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 6s. 1½d. to 8s. 7½d. carboy d/d according to purity, strength and locality.

Iodine.—Resublimed B.P., 9s. 2d. to 13s. per lb., according to quantity.

Lactic Acid.—Dark tech., 50% by vol., £31 per ton; 50% by weight, £38; 80% by weight, £67; pale tech., 50% by vol., £39 10s.; 50% by weight, £46, 80% by weight, £74. Not less than one ton lots ex works; barrels returnable, carriage paid.

Lead Acetate.—White, £46 10s. to £48 10s. ton lots. MANCHESTER: £46 to £48 per ton.

Lead Nitrate.—About £45 10s. per ton d/d in casks.

Lead, Red.—English, 5/10 cwt. £42; 10 cwt. to 1 ton, £41 15s.; 1/2 tons, £41 10s.; 2/5 tons, £41; 5/20 tons, £40 10s.; 20/100 tons, £40; over 100 tons, £39 10s. per ton, less 2½ per cent. carriage paid; non-setting red lead 10s. per ton dearer in each case. Continental material £1 per ton cheaper.

Lead, White.—Dry English, less than 5 tons, £53 10s.; 5/15 tons, £49 10s.; 15/25 tons, £49; 25/50 tons, £48 10s.; 50/200 tons, £48 per ton less 5 per cent. carriage paid; Continental material £1 per ton cheaper. Ground in oil, English, 1/5 cwt., £62; 5/10 cwt., £61; 10 cwt. to 1 ton, £60 10s.; 1/2 tons, £59; 2/5 tons, £58; 5/10 tons, £56; 10/15 tons, £55; 15/25 tons, £54 10s.; 25/50 tons, £54; 50/100 tons, £53 10s. per ton less 5 per cent., carriage paid. Continental material £2 per ton cheaper.

Litharge.—1 to 2 tons, £41 10s. per ton.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £14 to £17 per ton

Magnesium Chloride.—Solid (ex wharf), £12 to £13 per ton. MANCHESTER: £13 to £14 per ton.

Magnesium Sulphate.—Commercial, £10 to £12 per ton, according to quality, ex works.

Mercury Products.—Controlled price for 1 cwt. quantities: Bichloride powder, 12s. 3d.; bichloride lump, 12s. 10d.; ammon. chloride powder, 14s. 2d.; ammon. chloride lump, 14s.; mercurous chloride, 14s. 7d.; mercury oxide, red cryst., B.P., 16s. 4d.; red levig. B.P., 15s. 10d.; yellow levig. B.P. 15s. 9d.

Methylated Spirit.—Industrial 66 O.P. 100 gals., 2s. 0½d. per gal.; pyridinised 64 O.P. 100 gals., 2s. 1½d. per gal.

Nitric Acid.—£22—£30 per ton ex works.

Oxalic Acid.—From £60 per ton for ton lots, carriage paid, in 5-cwt. casks; smaller parcels would be dearer; deliveries slow.

Paraffin Wax.—Nominal.

Potash, Caustic.—Solid, 88/92%, commercial grade, £53 7s. 6d. per ton, c.i.f. U.K. port, duty paid.

Potassium Bichromate.—Crystals and granular 7d. per lb.; ground 7d. per lb., carriage paid. MANCHESTER and GLASGOW: 7d. per lb. in orig. casks.

Potassium Carbonate.—Hydrated, 83/85%, £46 17s. 6d. per ton; calcined, 98/100%, £52 2s. 6d. per ton, c.i.f. U.K. port.

Potassium Chlorate.—Imported powder and crystals, ex store London, 10d. to 1s. per lb.

Potassium Iodide.—B.P., 8s. to 11s. 2d. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, £26 to £30 per ton ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 5½d. per lb. for 1 cwt. lots; commercial, £7 9s. 6d. to £8 1s. 6d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, about 1s. 3d. to 1s. 5d. per lb., supplies scarce.

Salammoniac.—First lump, spot, £18 per ton; dog-tooth crystals, £50 per ton; medium, £18 10s. per ton; fine white crystals, £19 10s. per ton, in casks, ex store.

Soda, Caustic.—Solid, 76/77% spot, £14 17s. 6d. per ton d/d station.

Soda Crystals.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

Sodium Acetate.—£37 to £40 per ton, ex wharf.

Sodium Bicarbonate (refined).—Spot, £10 17s. per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 5¾d. per lb., anhydrous, 6d. per lb. net d/d U.K. MANCHESTER and GLASGOW: 5¾d. per lb., in orig. casks.

Sodium Bisulphite Powder.—60/62%, £17 10s. per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.

Sodium Chlorate.—£36 to £45 per ton, d/d, according to quantity.

Sodium Hyposulphite.—Pea crystals, £19 15s. per ton for 2-ton lots; commercial, £14 10s. per ton. MANCHESTER: Commercial, £14 10s.; photographic, £19 15s.

Sodium Iodide.—B.P., for not less than 28 lb., 8s. 10d. per lb.; for not less than 7 lb., 10s. 9d. per lb.

Sodium Metasilicate.—£14 5s. per ton, d/d U.K. in cwt. bags.

Sodium Nitrate.—Refined, £10 to £11 per ton for 6-ton lots d/d.

Sodium Nitrite.—£22 to £23 per ton for ton lots.

Sodium Perborate.—10%, £99 10s. per ton.

Sodium Phosphate.—Di-sodium, £19-£22 per ton, delivered, for ton lots. Tri-sodium, £25-£27 per ton d/d for ton lots.

Sodium Prussiate.—From 7d. per lb. ex store.

Sodium Silicate.—£9 15s. per ton, for 4-ton lots.

Sodium Sulphate (Glauber Salts).—£4 10s. per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. Spot £4 13s. 6d. per ton d/d station in bulk. MANCHESTER: about £4 2s. 6d. ex works.

Sodium Sulphide.—Solid 60/62%, Sopt, £16 10s. per ton d/d in drums; crystals, 30/32%, £11 7s. 6d. per ton d/d, in casks. MANCHESTER: 60/62% £15 12s. 6d.; 30/32%, £10 10s. per ton in 2-ton lots.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; Pea crystals, spot, £18 10s. per ton d/d station in kegs; commercial, £12 15s. per ton d/d station in bags.

Sulphur.—Finely powdered, 17s. 6d. per cwt. d/d; precip. B.P., 68s. per cwt.

Sulphuric Acid.—168° Tw., £6 2s. 3d. to £6 13s. 3d. per ton; 140° Tw., arsenic-free, £4 7s. 6d. to £4 17s. 6d. per ton; 140° Tw. arsenious, £4 per ton; quotations naked at sellers' works.

Tartaric Acid.—2s. 6½d. per lb., less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 2s. 6½d. per lb.

Zinc Oxide.—Maximum prices: White seal, £30 17s. 6d. per ton; red seal, £28 7s. 6d. d/d; green seal, £29 17s. 6d. d/d buyers' premises.

Zinc Sulphate.—Tech., about £25, carriage paid, casks free.

Rubber Chemicals

Antimony Sulphide.—Golden, 1s. 9d. to 2s. per lb. Crimson, 1s. 8d. to 2s. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Best white bleached, £7 3s. 6d. per ton.

Cadmium Sulphide.—5s. 6d. to 6s. 6d. per lb.

Carbon Black.—5¼d. to 7¾d. per lb., according to packing.

Carbon Bisulphide.—£32 5s. to £37 5s. per ton, according to quantity, in free returnable drums.

Carbon Tetrachloride.—£46 to £49 per ton.

Chromium Oxide.—Green, 1s. 6d. per lb.

India-rubber Substitutes. White, 5¾d. to 7¼d. per lb.; dark 5¼d. to 6d. per lb.

Lithopone.—30%, £25 per ton; 60%, £31 to £32 per ton. Imported material would be dearer.

Mineral Black.—£10 to £14 per ton.

Mineral Rubber, "Rupron."—£20 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—42s. per cwt., d/d.

Vermilion.—Pale or deep, 14s. 6d. per lb., for 7 lb. lots and less. Plus 5% War Charge.

Nitrogen Fertilisers

Ammonium Phosphate Fertilisers.—Type A, £21 8s.; B, £15 5s. 6d.; C, £18 17s. per ton in 6-ton lots, d/d farmer's nearest station up to June 30, 1941. Rebate of 1s. 6d. per ton per month for deliveries made prior to March 1, 1941.

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station: January, £9 19s.; February, £10 0s. 6d.; March/June, £10 2s.

Calcium Cyanamide.—Nominal; supplies very scanty.

Concentrated Complete Fertilisers.—£15 10s. to £16 3s. 6d. per ton in 6-ton lots, d/d farmer's nearest station up to June 30, 1941. Supplies small except C.C.F. Special at £15 14s. per ton.

"Nitro-Chalk."—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station up to June 30, 1941.

Sodium Nitrate.—Chilean, £13 10s. per ton in 2-ton lots, f.o.r. Liverpool, January delivery; agricultural, £10 14s. per ton in 2-cwt. bags, d/d farmer's nearest station up to June 30, 1941.

Coal Tar Products

Benzol.—Industrial (containing less than 2% of toluol), 2s. to 2s. 2d. per gal., ex works.

Carbolic Acid.—Crystals, 9½d. to 10¾d. per lb.; Crude, 60's 3s. 6d. to 4s. 2d., according to specification. MANCHESTER: Crystals, 10½d. per lb., d/d; crude, 3s. 6d. to 3s. 9d. naked at works.

Creosote.—Home trade, 5d. to 5½d. per gal., f.o.r., maker's works; exports 6d. to 6¼d. per gal., according to grade. MANCHESTER: 5d. to 7¼d. per gal.

Cresylic Acid.—Pale, 99/100%, 2s. 2d. per gal. MANCHESTER: Pale, 99/100%, 2s. 2d. per gal.

Naphtha.—Solvent, 90/160°, 2s. 3d. to 2s. 6d. per gal.; Heavy 90/190°, 1s. 7d. naked at works. MANCHESTER: 90/160°, 2s. 1d. to 2s. 3d. to 2s. 5d.

Naphthalene.—Crude, whizzed or hot pressed, £14 per ton; purified crystals, £27 per ton in 2-cwt. bags; flaked, £27 per ton. Fire-lighter quality, £6 to £7 per ton ex works. MANCHESTER: Refined, £26 per ton.

Pitch.—Medium, soft, 50s. per ton (nominal) f.o.b. MANCHESTER: Nominal.

Pyridine.—90/140°, 16s. 6d. per gal.; 90/160°, 13s. 6d.; 90/180°, 4s. to 5s. per gal., f.o.b. MANCHESTER: 13s. 6d. to 17s. per gal.

Toluol.—Pure, 2s. 5d., nominal. MANCHESTER: Pure, 2s. 5d. per gal., naked.

Xylol.—Commercial, 3s. 3d. per gal.; pure, 3s. 6d. MANCHESTER: 3s. 2d. to 3s. 6d. per gal.

Wood Distillation Products

Calcium Acetate.—Brown, £21 per ton; grey, £21. MANCHESTER: Grey, £21.

Methyl Acetone.—40.50%, £42-£45 per ton.

Wood Creosote.—Unrefined, 2s. per gal., according to boiling range.

Wood Naphtha, Miscible.—4s. 6d. to 5s. per gal.; solvent, 5s. per gal.

Wood Tar.—£5 to £6 per ton, according to quality.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

o-**Cresol** 30/31° C.—8d. to 9d. per lb. in ton lots.

p-**Cresol** 34/35° C.—1s. 8d. to 1s. 9d. per lb. in ton lots.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb.; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb.

Nitrobenzene.—Spot, 5½d. per lb., in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.

Nitronaphthalene.—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—January 30.—For the period ending March 1 per ton, net, naked, ex mill, works or refinery, and subject to additional charges according to package and location of supplies:—LINSEED OIL, raw, £11 10s. RAPESEED OIL, crude, £44 5s. COTTONSEED OIL, crude, £31 2s. 6d.; washed, £34 5s.; refined edible, £35 12s. 6d.; refined deodorised, £36 10s. SOYA BEAN OIL, crude, £33; refined deodorised, £37. COCONUT OIL, crude, £28 2s. 6d.; refined deodorised, £31 7s. 6d. PALM KERNEL OIL, crude, £27 10s.; refined deodorised, £30 15s. PALM OIL, refined deodorised, £37; refined hardened deodorised £41. GROUNDNUT OIL, crude, £35 10s.; refined deodorised, £40. WHALE OIL, crude hardened, 42 deg., £30 10s.; refined hardened, 42 deg., £33. ACID OILS.—Groundnut, £19; soya, £17; coconut and palm kernel, £22 10s. ROSIN, 25s. to 30s. per cwt., ex wharf,, according to grade. TURPENTINE, nominal (Glasgow, 70s. per cwt. spot, American, including tax, ex wharf, in barrels, and ex discount). LIVERPOOL: 69s. per cwt.

HULL.—January 14.—TURPENTINE, spot, American, nominal.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ALUMILITE & ALZAK, LTD., London, W., metallurgists, &c. (M., 8/2/41.) January 10, £250 mortgage to W. A. Parry, Worcester; charged on 21 Charles Street, Worcester.

County Court Judgments

PALMER THOS & CO. (a firm), Great Central Works, Rothley, Leicester, oil refiners & grease merchants. (C.C.J. 8/2/41.) £186 19s. 3d. November 8.

Receiverships

B. B. TECHNICAL LABORATORIES, LTD., Manufacturers of and dealers in chemicals, etc., 1, Warwick Street, W. 1. (R., 8/2/41.) Walter T. Meigh, of Norfolk House, Norfolk Street, Strand, W.C. 2., was appointed receiver and manager on January 22, 1941 under powers contained in debenture dated December 7, 1940.

R. & M.A. PRODUCTS, LTD., manufacturers of polishing, cleaning and scouring preparations, etc., 76, Brewery Road, Islington, N. 1. (R., 8/2/41.) R. Kandler, of Coventry House, South Place, E.C. appointed receiver and manager on (1) January 13, 1941, under powers contained in instrument dated May 9, 1940, and (2) January 14, 1941, under powers contained in instrument dated August 10, 1940.

Company News

Super Oil Seals & Gaskets have declared a final dividend of 25 per cent, making a total of 40 per cent, as against 37½ per cent.

Milton Proprietary, Ltd., have declared a dividend of 10 per cent for the year ended September 30. Net profit, before taxation, £28,559.

Price's Lubricants, Ltd., have increased their nominal capital beyond the registered capital of £10,000 by the addition of £140,000 in 140,000 shares of £1 each. The new shares were allocated to Slades' Trust, Ltd., on December 2 last.

Comtesse Laboratories, Ltd., 611/617, Salisbury House, London Wall, E.C. 2., have increased their nominal capital beyond the registered capital of £100 by the addition of £900 in 900 ordinary shares of £1 each.

Amalgamated Anthracite Collieries, Ltd., have passed the dividend on the 3½ per cent Cumulative Participating Preference stock for the second half of 1940. In the first half of 1940 the company paid 1 per cent on its Preference stock.

Chemical Trade Inquiries

Argentina.—A firm of agents established at Buenos Aires wishes to obtain the representation of United Kingdom manufacturers of glass ampoules and industrial chemicals and drugs. (Ref. No. 34.)

Brazil.—A firm of agents established at Rio de Janeiro wishes to obtain the representation of United Kingdom manufacturers of industrial and pharmaceutical chemicals, gums, and medicinal herbs. (Ref. No. 36.)

British West Indies.—An agent established in Trinidad wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of drugs and chemicals for the island. (Ref. No. 27.)

Mexico.—A firm of agents established at Mexico City wishes to obtain the representation of United Kingdom manufacturers of fine chemicals, raw materials for the confectionery trade, and industrial chemicals. (Ref. No. 38.)

New Companies Registered

Youlgreave Mines & Flour Refinery, Ltd. (364,999).—Private company. Capital: £2,000 in 2,000 shares of £1 each. Owners and managers of mines and quarries, manufacturers of and dealers in fluorspar, lead, spelter, metals, ores, alloys, chemicals, manures and by-products, scrap merchants, etc. Directors: Reginald E. Horrox; Reginald S. Horrox. Secretary: Douglas Kay. Registered office: 55 Norfolk Street, Sheffield.

James Burness & Sons, Ltd. (364,931).—Private company. Nominal capital of £100,000 in 90,000 5 per cent. redeemable cumulative preference and 10,000 ordinary shares of £1 each. Ironmasters, steel makers and converters, colliery proprietors, coke manufacturers, smelters, tinplate makers, manufacturers of chemicals, dyes and manures. Directors: John W. A. Burness; Col. Claude E. Thomson; Geo. K. Burness, all 15 St. Helens Place, E.C. Solicitors: Stoneham & Sons, 108a Cannon Street, E.C.4.

Economic Utilities, Ltd. (365,140).—Private company. Registered February 1. Capital: £100 in 100 shares of £1 each. Objects: To carry on the business of alchemists, chemists, pharmacists, druggists, drysalters, oil and colour men, manufacturers of and dealers in chemical, industrial, surgical, photographic, mechanical, engineering and other objects and preparations, etc. The subscribers (each with one share) are: Ernest Cooper, Cranley, Roundwood Park, Harpenden, Herts., master woodworker; Jan Briess, Springfield, Marle Road, Harpenden, merchant; Paul Kohn, 68 Berkeley Court, Baker Street, W.1, merchant; R. Kohn, 27 Chatsworth Court, Pembroke Road, W.8, chemist. E. Cooper is the first director. He is also a director of E. Cooper, Ltd. Qualification: None required. Solicitors: Jacques Asquith and Jacques, 146 Bishopsgate, E.C. Registered office: 2 Leyton Green, Harpenden, Herts.

Chemical and Allied Stocks and Shares

BUSINESS on the Stock Exchange has been at a low ebb, and industrial securities have again shown a slightly reactionary tendency, although very little selling was reported. Favourable views remain current in regard to the important financial results which fall to be issued during the next few weeks, and it is hoped that in many instances it may be possible to maintain dividend payments. Nevertheless, markets are likely to continue to be governed by a disposition to await the Budget, which is expected in many quarters to bring a further increase in income tax, although some modifications may be made in regard to E.P.T. Hopes of the latter have induced a somewhat better tendency in shares of various companies, more particularly those of iron and steel concerns, which have a very unfavourable E.P.T. standard. The announcement that developments in connection with British-owned companies in the U.S.A. are being considered with a view to increasing the dollar resources of the British Government, will presumably be of importance to many leading companies with subsidiaries and other interests in America, including Imperial Chemical Industries, Borax Consolidated, Courtaulds and "Shell" Transport. The shares of these companies have shown an easier tendency this week, with the exception of Borax Consolidated, whose financial results are imminent, but it is realised that some time may have to elapse before the final decision of the Government is announced.

Although the market is continuing to look for the maintenance of the dividend at 8 per cent, Imperial Chemical ordinary units were a few pence lower at 29s. 7½d. On the other hand, the 7 per cent. preference units were firm at 33s. 6d. Turner & Newall went back to 66s. 3d. in accordance with the easier tendency on the Stock Exchange, while Lever & Unilever were 23s. 6d. and Barry & Staines at 26s. 6d. lost 6d. of their recent improvement. Nairn & Greenwich, however, were maintained at 51s. 3d. and although the units of the Distillers Co. reacted to 64s. 9d., United Molasses were higher at 24s. 10½d. the market being very hopeful that the dividend of the latter company might be maintained. Borax Consolidated deferred were better at 28s. 9d. awaiting the impending dividend announcement, and the company's preferred ordinary units also changed hands at an improved price. British Oxygen were fairly steady at 65s. although in view of the larger capital now ranking, there is some doubt whether the dividend will be kept on a 17 per cent basis.

Business in B. Laporte has taken place up to 56s. 3d. and in Fison Packard up to 33s. 9d. Cooper McDougall & Robertson were again around 20s. and Burt Boulton & Haywood transferred at 10s. Business at 7s. was recorded in Lawes Chemical shares and in Monsanto Chemicals preferenc at 22s. 1½d. Financial results of the last-named company are due shortly. Goodlass Wall ordinary and preferred both changed hands around 10s. their par value, and the preference shares showed dealings up to 27s. 6d. Some attention was given to the 2s. ordinary shares of British Industrial Plastics, which transferred up to 2s. 6d.

United Glass Bottle ordinary shares changed hands at the higher level of 48s. there being anticipations in the market that the results, due next month, are likely to show the maintenance of the dividend at 12 per cent. General Refractories held their recent improvement to 8s. 4½d., but in other directions, an easier tendency developed in Courtaulds, British Match and Dunlop Rubber, while Wall Paper Manufacturers deferred units were 22s. 6d. Cement shares were steady, and British Plaster Board remained at 13s 3d. Small gains were shown in iron and steel securities, including Consett Iron and Stewarts & Lloyds, but, exceptionally, Richard Thomas issues were easier. In other directions, Boots Drug were 38s. 3d. and British Drug Houses 22s. 6d.